Donald Abelson
Chief of the International Bureau
Federal Communications Commission
445 12th Street SW
Washington, D.C. 20554

Dear Mr. Abelson:

The National Telecommunications and Information Administration on behalf of the Executive Branch Agencies, has approved the release of additional Draft Executive Branch (NTIA) proposals and preliminary views considering federal agency inputs toward the development of U.S. Proposals for WRC-2003. These proposals and preliminary view are forwarded your consideration and review by the WRC-2003 Advisory Committee.

The following is summary information concerning the documents contained in the attachment:

Proposals:

Agenda Item 1.15 (Resolution 605): This proposal was drafted by the FCC WAC and was reviewed and revised by the RCS. The proposal is concerned with the protection of ARNS in the 960-1215 MHz band. The RCS is addressing the protection of ARNS by proposing no change to the current text in footnote **S5.328** and modifing footnote **S5.328A**. A new section will be added to Article **S21** that addresses sharing between terrrestrial and space services in the bands above 1 GHz. Also a new resolution has been drafted that addresses the operation RNSS. Resolution **605** will be deleted.

Agenda Item 1.15 (Resolution 606): This proposal was drafted by the FCC WAC and was approved by the RCS with minor edits. The proposal is concerned with RNSS in the 1215 – 1300 MHz band. The RCS is proposing the suppression of Resolution **606** because it has been determined there is no need for a power flux-density limit in the 1215-1300 MHz band. As a consequence the reference to Resoluion **606** is being deleted from footnote **S5.329**.

Agenda Item 1.17: This proposal was drafted by the RCS and is concerned with the changes in the requirement and missions of the radiolocation service in the 2900 – 3100 MHz band. The RCS is proposing the upgrade of radiolocation to primary. Also it is proposing a new footnote **S5.XXX,** which should provide protection for the radionavigation service.

Agenda Item 1.28: This proposal was drafted by the RCS and is concerned with the Global Navigation Satellite System (GNSS), which will transmit differential correction (augmentation) data. The new ground-based augmentation systems (GBAS) are planned to operate in the band 108-117.975 MHz. It has been argued that GBAS does not fall within the definition of a radionavigation service. The addition of **S5.196** would assure that GBAS could be used in the 108-117.975 MHz band.

Agenda Item 1.37: This proposal was drafted by the FCC WAC and was approved by the RCS with minor format edits. The proposals under agenda item 1.37 are intended to avoid any potential confusion regarding the applicability of newly-adopted regulations in Articles **S21** and **S22** to all non-GSO systems, including those employing highly-elliptical orbits.

Agenda Item 1.39: This proposal was drafted by the FCC WAC and was approved by the RCS with some edits. The goal of this agenda item is to examine the spectrum requirements in the fixed-satellite service bands below 17 GHz for telemetry, tracking and telecommand of fixed-satellite service networks operating with service links in the frequency bands above 17 GHz. The studies to-date do not indicate that any new regulatory provisions or procedures would be required to meet the spectrum requirements for the operation of TT&C below 17 GHz for FSS systems with service links above 17 GHz. The RCS proposal recommends no change to **S1.23** and to Article **S5**.

Preliminary View

Agenda Item 1.30[c]: This preliminary view drafted by the FCC WAC and was approved by the RCS. It is concerned with advance publication, coordination and notification of satellite networks. The proposed U.S. View favors the simplication of the filing and coordination process.

Jim Vorhies from my staff will contact Alexander Roytblat and reconcile any differences.

Sincerely,

(Original Signed January 29, 2002)
William T. Hatch
Associate Administrator
Office of Spectrum Management

Enclosures

United States of America

DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

Proposal for Resolution 605

Agenda Item 1.15: to review the results of studies concerning the radionavigation-satellite service in accordance with Resolutions **604 (WRC-2000)**, **605 (WRC-2000)** and **606 (WRC-2000)**;

Background Information: WRC-2000 introduced new allocations in the band 1 164-1 215 MHz for use by the radionavigation-satellite service (RNSS) (space-to-space) and (space-to-Earth) with a provisional aggregate pfd limit of -115 dB (W/m^2) in any 1 MHz band produced at the Earth's surface by all space stations within all RNSS systems and for all angles of arrival. It also stated in **S5.328A** of the Radio Regulations that the provisions of Resolution **605 (WRC-2000)** apply. There was extensive discussion at WRC-2000 with regard to the need for a pfd limit and the value needed to protect aeronautical radionavigation service (ARNS) systems (including DME). Resolution **605** requested the ITU-R to study the technical, operational, and regulatory aspects of compatibility between RNSS and ARNS in the band 9 60-1 215 MHz, including an assessment of the need for an aggregate pfd limit. If such a need exists, the ITU-R was requested to revise, if necessary the provisional pfd limit given in **S5.328A** concerning the operation of RNSS (space-to-Earth) systems in the frequency band 1 164 – 1 215 MHz.

The ITU-R has determined that ARNS systems require protection from the aggregate of emissions from RNSS (space-to-Earth) systems and networks that collectively exceed –116.8 dB (W/m^2) in any 1 MHz produced at the Earth's surface. There is, however, no reliable way for the Bureau to validate compliance by all RNSS systems with an aggregate pfd limit. Studies within the ITU-R reveal that there are a number of profound technical and regulatory reasons why establishment of the regulatory device of a permanent aggregate pfd limit on RNSS emissions in the 1 164-1 215 MHz band would fail to provide the protection to ARNS systems that is required and intended under **No. S5.328A** of the Radio Regulations, and would significantly and unduly constrain the development and implementation of RNSS systems in this band.

Addressing Resolution **605**, the U.S. has a strong need for both use of the RNSS spectrum and the continued operation of ARNS systems in the 1 164-1 215 MHz band. Furthermore, the U.S. is committed to protecting current and future ARNS systems operating in the same band as RNSS from harmful interference. This protection needs to be provided without unnecessarily delaying or hindering the implementation and provision of RNSS (space-to-Earth) services.

Based on its studies and studies within the ITU, the U.S. has identified a preferred regulatory approach for achieving the meaningful protection of the ARNS without unduly constraining RNSS development and operation. This approach is based on elements of Method B and Method C of the CPM report. It mandates the provision of aggregate interference protection at the level identified in ITU-R studies, but commits enforcement of the requirement to those administrations that actually operate and actually intend to operate RNSS systems. The approach manages the total amount of interference caused by these systems through the collaborative agreement on the part of administrations proposing and operating the RNSS systems. In this manner, there is no additional regulatory burden for the Bureau (which will not be tasked to validate compliance with the protection criterion); there will be a need for coordination among RNSS operators (both formal in an Article **S9** sense and informal thereafter pursuant to the provisions of the proposed new resolution and associated provisions in the Radio Regulations); and neither ARNS systems nor RNSS operators are faced with artificial or insufficient

regulations that could leave them exposed to interference or forced to make unnecessary adjustments that inhibit the efficient use of the orbital/spectrum resource. The approach also takes account of the RRB concern about having multiple inconsistent regulations applicable to the same band.

Proposals:

USA/ /1
(MOD)

960-1 215 MHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
960-1 215	AERONAUTICAL RADIONAVIGATION S5.328 **MOD** S5.328A	

Reasons: Consequential change.

USA/ /2
NOC

S5.328

Reasons: The current text is adequate.

USA/ /3
MOD

S5.328A *Additional allocation:* the band 1 164-1 215 MHz is also allocated to the radionavigation-satellite service (space-to-Earth) (space-to-space) on a primary basis. ~~The aggregate power flux-density produced by all the space stations of all radionavigation-satellite systems at the Earth's surface shall not exceed the provisional value of –115 dB(W/m^2) in any 1 MHz band for all angles of arrival.~~ Stations in the radionavigation-satellite service in the band 1 164-1 215 MHz shall ~~not cause harmful interference to, nor claim protection from, stations of the aeronautical-radionavigation service~~ operate in accordance with the provisions of Resolution **RNSS (WRC-03)** ~~**605 (WRC-2000)**~~ and shall not claim protection from stations in the aeronautical-radionavigation service. No. **5.43A** does not apply. The provisions of Nos. **S21.18** apply.

Reasons: The suppression of the second and modification of the third sentence reflect the incorporation into new Draft Resolution **RNSS (WRC-03)** and associated Radio Regulations (see below) of the mechanisms for ensuring the protection of ARNS against harmful interference from RNSS (space-to-Earth) systems.

Discussions between RNSS administrations, both during formal coordination and after, are critical to the success of the regulatory determination to commit to administrations the obligation to ensure that the aggregate protection criterion of the ARNS is satisfied. Thus, the new provision in new **No. S21.18** (see below) is specifically referenced.

USA/ /4
ADD

Section VI – Protection of aeronautical radionavigation service systems from aggregate emissions of space stations of radionavigation-satellite service systems in the 1 164-1 215 MHz band

S21.18 § 7 Administrations operating or planning to operate radionavigation-satellite service systems or networks in the 1 164-1 215 MHz frequency band, for which complete coordination or notification information, as appropriate, was received by the Bureau after 2 June 2000, shall, in accordance with *resolves* 2 of Resolution **RNSS (WRC-03)**, take all necessary steps to ensure that the actual aggregate interference into aeronautical radionavigation service systems caused by RNSS systems or networks operating co-frequency in these frequency bands does not exceed the aggregate power levels shown in *resolves* 1 Resolution **RNSS (WRC-03)**.

Reasons: Article **S21** of the Radio Regulations addresses sharing between terrestrial and space services in frequency bands above 1 GHz. Placement of this provision in a new Section **VI** of Article **S21** brings into the Radio Regulations the critical elements from new Resolution **RNSS (WRC-03)** (see proposal below) that make mandatory the collective obligation of administrations operating RNSS systems at 1 164-1 215 MHz to ensure that the aggregate protection criterion from *resolves* 1 of Resolution **RNSS** is not exceeded, as well as the requirement to reduce emissions if administrations operating ARNS systems identify excess emission levels.

USA/ /5
ADD

RESOLUTION RNSS (WRC-2003)

Protection of aeronautical radionavigation service systems from the aggregate power flux-density produced by radionavigation-satellite service networks and systems in the 1 164-1 215 MHz frequency band

The World Radiocommunication Conference (Caracas, 2003),

considering

a) that the band 960-1 215 MHz is allocated on a primary basis to the aeronautical radionavigation service (ARNS) in all Regions;

b) that the band 1 164-1 215 MHz is also allocated on a primary basis to the radionavigation-satellite service (RNSS), subject to the condition in **No. S5.328A** that operation of RNSS systems shall be in accordance with this Resolution;

c) that protection of the ARNS from harmful interference can be achieved if the value of the aggregate power flux-density produced by all the space stations of all RNSS (space-to-Earth) systems in the band referred to in *considering* a) does not exceed the level of [–116.6] dB(W/m^2) in any 1 MHz band for all angles of arrival;

d) that WRC-2000 adopted Resolution **605 (WRC-2000)** to provide for implementation of a provisional aggregate power flux-density limit during the period between WRC-2000 and WRC-2003,

and requested ITU-R studies on the need for an aggregate pfd limit, and revision, if necessary, of the provisional pfd limit given in No. **S5.328A**;

e) that only a limited number of RNSS systems are expected to be deployed in the 1 164-1 215 MHz band, and only a few of these systems at most would have overlapping frequencies;

f) that ARNS systems can be protected without placing undue constraints on the development and operation of RNSS systems in this band;

g) that to achieve the objectives in *considering* f), administrations operating RNSS systems will need to agree cooperatively to achieve the level of protection for ARNS systems that is stated in *considering* c);

h) that it may be appropriate for representatives of administrations operating ARNS systems to be involved in determinations made pursuant to *considering* g);

resolves

1 that, in order to protect ARNS systems, administrations shall ensure, without validation by the Bureau pursuant either to **No. S11.31** or **S9.35** of the Radio Regulations, that the aggregate pfd level produced by all space stations of all radionavigation-satellite service systems at the Earth's surface does not exceed the level, [–116.6] dB(W/m^2) in any 1 MHz band for all angles of arrival;

2 that administrations operating or planning to operate in the 1 164-1 215 MHz frequency band RNSS systems or networks for which complete coordination or notification information, as appropriate, was received by BR after 2 June 2000, in collaboration, shall take all necessary steps, including by means of appropriate modifications to their systems or networks, to ensure that the aggregate interference into ARNS systems caused by such RNSS systems or networks operating co-frequency in these frequency bands does not exceed the level of the aggregate protection criterion given in *resolves* 1 above;

3 that administrations, in carrying out their obligations under *resolves* 1 and 2 above, shall take into account only those RNSS systems with frequency assignments in the band 1 164-1 215 MHz that have met all of the milestones listed in the Annex to this Resolution;

4 that administrations shall communicate to the Bureau the results of any aggregate sharing determinations made in application of *resolves* 2 above, without regard to whether such determinations result in any modifications to the published characteristics of their respective systems or networks;

5 that administrations operating ARNS systems in the 1 164-1 215 MHz band should participate, as appropriate, in discussions and determinations relating to the resolves above,

invites the ITU-R

to continue to develop, as a matter of urgency a suitable methodology for calculating the aggregate power flux-density produced by all RNSS systems operating or planning to operate co-frequency in the 1 164-1 215 MHz frequency band into ARNS systems, which may be used by administrations to determine whether the systems are in compliance with the aggregate power levels given in *resolves* 1 above.

ANNEX
Milestone Criteria for Application of Resolution RNSS

1. Submission of appropriate ITU Advance Publication, and Coordination or Notification documentation.

2. Entry into satellite manufacturing or procurement agreement:

   The RNSS system or network operator should possess clear evidence of a binding agreement for the manufacture or procurement of its satellites. The agreement should identify the contract milestones leading to the completion of manufacture or procurement of satellites required for the service provision. The Notifying Administration is responsible for authenticating the evidence of agreement and providing such evidence to other interested administrations in furtherance of its obligations under this Resolution.

3. Entry into satellite launch agreement:

   The RNSS system or network operator should possess clear evidence of a binding agreement to launch its satellites. The agreement should identify the launch date, launch site, and launch service provider. The Notifying Administration is responsible for authenticating the evidence of agreement and providing such evidence to other interested administrations in furtherance of its obligations under this Resolution.

Reasons: This resolution and annex, along with incorporating provisions in Articles **S5** (MOD **S5.328A**) ,and **S21** (ADD Section VI), provides the mechanism by which administrations operating or planning to operate RNSS systems, all of which also operate co-frequency ARNS systems, will undertake the responsibility for ensuring the protection of ARNS systems. The resolution recognizes that there is a need for discussions between and among administrations operating RNSS systems to ensure compliance with the obligation to protect ARNS systems, and that such discussions may involve administrations operating ARNS systems. Resolution **RNSS** thus provides a basis for managing the total aggregate interference caused to ARNS systems by real RNSS systems.

USA/ /6
SUP

RESOLUTION 605 (WRC-2000)

Reasons: This resolution is no longer needed because of the changes made to **S5.328A,** the addition of Section **VI** to Article **S21** and the addition of Resolution **RNSS**.

United States of America

DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

Proposal for Resolution 606

Agenda Item 1.15: to review the results of studies concerning the radionavigation-satellite service in accordance with Resolutions **604 (WRC-2000)**, **605 (WRC-2000)** and **606 (WRC-2000);**

Background Information: WRC-2000 agreed to additional allocations to the Radionavigation Satellite Service (RNSS) (space-to-Earth) in the 1 260-1 300 MHz band making the entire 1 215-1 300 MHz band available for the use of this service in the band 1 215-1 300 MHz. This band was also allocated to the RNSS (space-to-space). The band 1 240-1 300 MHz is also allocated on a co-primary basis to radiolocation and radionavigation services for use of long-range primary radar systems. Studies were conducted pursuant to the provisions of this Resolution. Among other things, Resolution **606** called for studies on "the need for a power flux-density limit concerning the operation RNSS (space-to-Earth) systems in the frequency band 1 215–1 300 MHz in order to ensure that the radionavigation-satellite service (space-to-Earth) will not cause harmful interference to the radionavigation and radiolocation services." Also in Resolution **606**, WRC-2000 resolved that no additional constraints are to be placed on RNSS systems operating in the 1 215-1 260 MHz band.

The GPS, an RNSS system which operates on 1 227.6 MHz (24 MHz bandwidth), has been in operation in the band 1 215–1 260 MHz since 1978. It provides positioning and navigation services from space. Currently, this signal is used for high precision GPS in high productivity applications, such as machine guidance in survey, construction, agriculture, and mining. This signal has been transmitted at its current power level for over 23 years and there has been no reported harmful interference to other users of the band. This has been accomplished without the need for power flux-density limits in the Radio Regulations (see also Recommendation ITU-R M.1088). There are large numbers of Global Positioning System (GPS) receivers operating in the band 1 215-1 260 MHz.

It is noted that the GLONASS RNSS system has also operated successfully in the 1 215-1 260 MHz band for many years without causing harmful interference to other co-frequency systems. This is accomplished on the basis given in Recommendation ITU-R M.1317 and includes a signal of up to –133 dB W/m^2/MHz. Operational experience with current GPS and GLONASS system characteristics in the 1 215-1 260 MHz band, has not led to any reports of harmful interference being caused to existing radar systems.

As RNSS system characteristics are expected to evolve and new systems are planned, analyses are being conducted to determine the impact of a more powerful RNSS space-to-Earth signal on radar systems in the 1 215-1 300 MHz band.

Some administrations have planned RNSS systems that have a future requirement to produce a pfd level higher than –133 dB (W/m^2/MHz) in the 1 215-1 260 MHz band.

Users of radars in the band will be protected in accordance with the provision of **No. S5.329**.

Proposals:

USA/ /7
NOC

1 215-1 240 MHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
1 215-1 240	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) (MOD) S5.329 S5.329A SPACE RESEARCH (active) S5.330 S5.331 S5.332	
1 240-1 260	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) (MOD) S5.329 S5.329A SPACE RESEARCH (active) Amateur S5.330 S5.331 S5.332 S5.334 S5.335	
1 260-1 300	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) (MOD)S5.329 S5.329A SPACE RESEARCH (active) Amateur S5.282 S5.330 S5.331 S5.334 S5.335 S5.335A	

Reasons: Noting **No. S5.329**, there is no need for a power flux-density limit to be imposed in 1 215-1 300 MHz band. Some administrations have successfully operated RNSS and radar systems in the 1 215-1 260 MHz band for more than 23 years with no reported harmful interference.

USA/ /8
MOD

S5.329 Use of the radionavigation-satellite service in the band 1 215-1 300 MHz shall be subject to the condition that no harmful interference is caused to, and no protection is claimed from, the radionavigation service authorized under No. **S5.331**. ~~See also Resolution **606 (WRC-2000)**.~~

Reasons: Consequential to the determination that there is no need for a power flux-density limit to be imposed in the 1 215-1 300 MHz band.

USA/ /9
SUP

RESOLUTION 606 (WRC-2000)

Reasons: Consequential to the determination that there is no need for a power flux-density limit to be imposed in the 1 215-1 300 MHz band.

United States of America

DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE

Agenda Item 1.17: to consider upgrading the allocation to the radiolocation service in the frequency range 2 900-3 100 MHz to primary;

Background Information: Due to changes in requirements and missions of the radiolocation service, it is necessary to augment existing primary allocations in bands below 6 GHz where unique propagation properties exist. Changes in technology are driving a need for larger bandwidth in order to be able to pick smaller and less reflective radar targets out of background clutter. The radiolocation service, while recognizing the special needs of radionavigation services as noted in RR **S.4.10**, has demonstrated compatible operations with aeronautical and maritime radionavigation radars in common bands, including the 2 900-3 100 MHz band, which is now shared on a secondary basis.

ITU-R studies on maritime radionavigation radars and emissions from radiolocation radars in the band 2 900 - 3 100 MHz, illustrate compatibility between radiolocation radars and radionavigation radars operating in the 2 900 - 3 100 MHz band. These tests indicate that typical maritime navigation radars can suppress emissions from other radars, even when that interference is received with very high I/N ratios, and when the unwanted pulsed waveform is asynchronous and has a low duty cycle. These test results confirm the historical sharing experience between the two services in the 2 900-3 100 MHz band. ITU-R Draft New Report on factors that mitigate interference from radiolocation radars to maritime and aeronautical radionavigation radars in the 2 900 - 3 100 MHz band, confirms that interference from radiolocation radars to maritime and aeronautical radionavigation radars in the 2 900 - 3 100 MHz band can be mitigated.

Few aeronautical radionavigation radars use this band, and characteristics of those aeronautical radionavigation radars have not been documented within the ITU-R. However, characteristics of aeronautical radionavigation radars using the adjacent 2 700 - 2 900 MHz band have been documented in Recommendation ITU-R M.1464, and are expected to be similar to those in the 2 900 - 3 100 MHz band. Similarly, weather radars, which resemble radiolocation radars in their beam scanning, have been operated successfully in close proximity with aeronautical navigation radars in the 2 700 - 2 900 MHz band. Radionavigation radars that have operated in this band have demonstrated compatible operations with the radiolocation systems, mainly as a result of newer radar design features that mitigate received radar-to-radar interference as described in Recommendation ITU-R M.1372.

Proposal:

2 900-3 100 MHz

	Allocation to services		
	Region 1	**Region 2**	**Region 1**
USA/ /10 **MOD**	**2 900-3 100 MHz**	RADIONAVIGATION S5.425 S5.426 S5.427 ~~Radiolocation~~ RADIOLOCATION **ADD** S5.XXX	

Reasons: Provides worldwide primary allocation with respect to future entrants.

USA/ /11
ADD

S5.XXX The radiolocation service operating in the band 2 900 - 3 100 MHz band shall not cause harmful interference to, nor claim protection from or constrain the use and development of, the radionavigation service operating in accordance with the Radio Regulations.

Reasons: The radionavigation service will continue to be protected.

United States of America

DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

Agenda Item 1.28: to permit the use of the band 108-117.975 MHz for the transmission of radionavigation satellite differential correction signals by ICAO standard ground-based systems;

Background Information: An aviation requirement has emerged for the transmission of differential correction (augmentation) data for the Global Navigation Satellite System (GNSS), to be used by aircraft receivers to satisfy the stringent accuracy and integrity requirements for GNSS applications. The new ground-based augmentation systems (GBAS) are planned to operate in the band 108-117.975 MHz (initially, 112-117.975 MHz), which is currently used by Instrument Landing Systems (ILS) and VHF Omni-directional Ranging (VOR) systems.

The band is currently allocated to the aeronautical radionavigation service. It has been argued that GBAS does not fall within the definition of a radionavigation service (i.e., using the property of the propagation characteristics of radio waves) and that an amendment to the allocation would therefore need to be made to allow for the transmission of GNSS augmentation data.

ICAO is developing compatibility and frequency planning criteria between the VOR/ILS, and the new service. GBAS receiver performance will be compatible with FM broadcast services in the band 87.5-108 MHz, and compatibility will be assured without imposing further restrictions on broadcast stations.

Proposal:

108-117.975 MHz

	Allocation to services		
	Region 1	**Region 2**	**Region 3**
USA/ /12 **MOD**	**108-117.975**	AERONAUTICAL RADIONAVIGATION S5.197 **ADD** S5.XXX	

Reasons: The modification to the table is a consequential change from adding the new footnote.

USA/ /13
ADD

S5.XXX Stations of the aeronautical radionavigation service in the band 108-117.975 MHz may transmit supplementary navigation information for ground-based augmentation systems that conform to recognized international aviation standards, on the condition that no harmful interference is caused to other stations of the aeronautical radionavigation service.

Reasons: A footnote in the Radio Regulations will permit the use of the band 108–117.975 MHz, on a worldwide basis, for the transmission of radionavigation satellite differential correction signals by an international aeronautical standard ground-based system. The use of GBAS will increase the accuracy of satellite radionavigation systems and conform to the requirements for precision landing

United States of America

DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

Agenda Item 1.37: to consider the regulatory and technical provisions for satellite networks using highly elliptical orbits (HEOs);

Background Information: The ITU-R has been considering the sharing aspects of HEO satellite systems (occasionally referred to as "quasi-geostationary" systems) in a number of contexts over the last several years.

A subcategory of non-GSO systems, HEO systems are intended for operation or are already operational in several FSS bands above 3 GHz. In certain configurations, HEO systems offer promise in terms of their ability to facilitate the introduction of large numbers of such co-frequency non-GSO FSS systems, as well as in terms of their potential ability to co-exist successfully with GSO networks and terrestrial systems.

To date, several categories of orbits that are encompassed within the term "highly elliptical" have been identified within the ITU-R. All highly-elliptical orbits, however, are non-geostationary orbits, and all HEO systems are non-geostationary systems. In this regard, recent studies in certain frequency bands between 10 and 30 GHz resulted in a series of new regulations in Articles **S21** and **S22** that were adopted at the 1997 and 2000 WRCs, including pfd limits on non-GSO FSS systems to protect terrestrial systems and epfd limits on non-GSO FSS systems to protect GSO FSS and BSS networks. The pfd and epfd limits and associated provisions that were imposed on non-GSO FSS systems in the applicable segments of the 10-30 GHz band apply to non-GSO FSS systems in highly elliptical orbits.

The following proposals under agenda item 1.37 are intended to avoid any potential confusion regarding the applicability of newly-adopted regulations in Articles **S21** and **S22** to all non-GSO systems, including those employing highly-elliptical orbits.

It is expected that there will be additional proposals under this agenda item to address HEO use of other frequency bands.

Proposals:

USA/ /14
NOC

TABLE **S21-4** *(continued)*

Frequency band	Service*	Limit in dB(W/m²) for angle of arrival (δ) above the horizontal plane			Reference bandwidth
		0°-5°	5°-25°	25°-90°	
….					
10.7-11.7 GHz	Fixed-satellite (space-to-Earth), non-geostationary-satellite orbit	–126	–126 + 0.5(δ – 5)	–116	1 MHz
11.7-12.5 GHz (Region 1) 12.5-12.75 GHz (Region 1 countries listed in Nos. **S5.494** and **S5.496**) 11.7-12.7 GHz (Region 2) 11.7-12.75 GHz (Region 3)	Fixed-satellite (space-to-Earth), non-geostationary-satellite orbit	–124	–124 + 0.5(δ – 5)	–114	1 MHz
…..					
17.7-19.3 GHz [7, 8]	Fixed-satellite (space-to-Earth) Meteorological-satellite (space-to-Earth)	–115 [12*bis*] or –115 – *X* [12]	–115 + 0.5(δ – 5) [12*bis*] or –115 – *X* + ((10 + *X*)/20)(δ – 5) [12]	–105 [12*bis*] or –105 [12]	1 MHz
…..					

Reasons: The current limits and associated provisions in Section V of Article **S21** that were finalized at WRC-2000 for all non-GSO FSS systems in certain bands between 10 and 30 GHz apply in full to non-GSO FSS systems in highly-elliptical orbits. No additional regulatory provisions are needed for HEO systems in these bands.

USA/ /15
NOC

ARTICLE S22

Space services[1]

Section II – Control of interference to geostationary-satellite systems

Reasons: The current limits and associated provisions in Section II of Article **S22** that were finalized at WRC-2000 for all non-GSO FSS systems in certain bands between 10 and 30 GHz apply in full to

non-GSO FSS systems in highly-elliptical orbits and are necessary for the protection of co-frequency GSO FSS and BSS systems. No additional regulatory provisions are needed for HEO systems in these bands, and no lessening of the protection required by GSO systems in the same bands should be considered.

USA/ /16
NOC

RESOLUTION 76 (WRC-2000)

Reasons: The current provisions in Resolution **76 (WRC-2000)** for protection of GSO FSS and BSS networks from the maximum aggregate epfd produced by multiple non-GSO FSS systems in certain bands between 10 and 30 GHz apply in full to non-GSO FSS systems in highly-elliptical orbits and are necessary for the protection of co-frequency GSO FSS and BSS systems. No additional regulatory provisions are needed for HEO systems in these bands, and no lessening of the protection required by GSO systems in the same bands should be considered.

United States of America

DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

Agenda Item 1.39: to examine the spectrum requirements in the fixed-satellite service bands below 17 GHz for telemetry, tracking and telecommand of fixed-satellite service networks operating with service links in the frequency bands above 17 GHz*;*

Background Information: WRC-03 agenda item 1.39 identifies the need to examine the spectrum requirements in the FSS service bands below 17 GHz for Telemetry, Tracking & Command (TT&C) of FSS networks operating in the frequency bands above 17 GHz.

Some fixed-satellite service (FSS) systems utilize the existing s~~S~~pace o~~O~~peration s~~S~~ervice allocations (all of which are below 3 GHz) for TT&C while others use part of the FSS band allocations to perform this function (FSS (space-to-Earth) for space telemetry and tracking carriers, FSS (Earth-to-space) for telecommand). Propagation conditions and spectrum availability are of primary consideration when implementing TT&C subsystems, which must meet high reliability criteria. Transmissions above 17 GHz experience higher free-space and rain attenuation losses than those below 17 GHz. Under the ITU regulatory structure, FSS systems may use any FSS allocation to perform TT&C functions.

Working Parties 4A and 4B have performed various studies in response to agenda item 1.39. WP 4B is investigating the reliability and availability requirements of TT&C systems operating with service links in frequency bands above 17 GHz. WP 4A has compiled technical and operational characteristics of TT&C subsystems, considered the TT&C spectrum requirements of systems operating above 17 GHz and evaluated the potential coordination implications.

The results of studies in WP 4A show that it may be difficult to implement in-band TT&C ~~in-band~~ for service links above 17 GHz since these operations are required to be reliable and the performance of TT&C links above 17 GHz is limited by a number of factors. With respect to potential constraints on the bands below 17 GHz, the following factors facilitate the coordination of TT&C carriers and minimize constraints: TT&C carriers occupy a small portion of the satellite bandwidth and through appropriate frequency planning they are usually accommodated, and; TT&C earth stations usually employ large antennas which reduces interference susceptibility and the input power requirements. At its October 2001 meeting, WP 4A determined that ~~currently,~~ the bands below 17 GHz currently appear to offer the flexibility to accommodate these additional spectrum requirements for TT&C.

Considering the above, the studies to-date do not indicate that any new regulatory provisions or procedures would be required to meet the spectrum requirements for the operation of TT&C below 17 GHz for FSS systems with service links above 17 GHz.

Proposal:

~~ARTICLE S1~~

~~Terms and definitions~~

~~Section III – Radio services~~

~~**USA/xx/1**~~
~~**NOC**~~

~~**S1.23** *space operation service:* A *radiocommunication service* concerned exclusively with the operation of *spacecraft*, in particular *space tracking, space telemetry* and *space telecommand*.~~

~~These functions will normally be provided within the service in which the *space station* is operating.~~

~~**Reasons**: The current regulatory situation provides sufficient and appropriate flexibility to accommodate the spectrum requirements for the TT&C of systems with service links operating above 17 GHz. It is considered that no regulatory or procedural action is required under this agenda item.~~

USA/xx/17
NOC

ARTICLE S5

Frequency allocations

Reasons: The current regulatory situation provides sufficient and appropriate flexibility to accommodate the spectrum requirements for the TT&C of systems with service links operating above 17 GHz. It is considered that no regulatory or procedural action is required under this agenda item. This proposal does not preclude modifications to Article **S5** under ~~other~~ agenda items other than agenda item 1.39.

DRAFT UNITED STATES PRELIMINARY VIEWS ON WRC-03

WRC-2003 Agenda Item 1.5: To consider, in accordance with Resolution **736** (WRC-2000), regulatory provisions and spectrum requirements for new and additional allocations to the mobile, fixed, Earth exploration-satellite and space research services, and to review the status of the radiolocation service in the frequency range 5 150-5 725 MHz with a view to upgrading it, taking into account the results of ITU-R studies

ISSUE: The technical feasibility of accommodating all of the requests for new and additional allocations for the mobile, fixed (Region 3), Earth exploration-satellite (EESS) and space research (SRS) services and also the upgrade of the radiolocation allocation in a limited amount of spectrum.

BACKGROUND: At WRC-2000 there were several proposals for items to be placed on the WRC-03 Agenda dealing with spectrum in the 5 GHz range. These items included new and additional allocations to the mobile (for Radio Local Area Networks (RLAN)), fixed (for Fixed Wireless Access (FWA) in Region 3), Earth exploration-satellite (active) and space research (active) services. Also, an upgrade of the radiolocation allocation in 5 350-5 650 MHz was proposed. These were combined into one agenda item, since the possible allocation to any one of these services would affect the potential allocation of one or more of the other services within this frequency range.

Technology has evolved to the point where wireless networks can be readily and inexpensively deployed to support the businessman or student that is in a campus environment. These devices are becoming widely used in some parts of the world, particularly in North America and Europe. The U.S. domestic allocation table allows for the use of RLAN and FWA devices on an unlicensed, non-protected, non-interference basis in the 5 150-5 350 and 5 725-5 825 MHz bands. These devices have power level and antenna gain restrictions on them to protect the existing allocated services and can neither claim protection from nor cause interference to the existing services in these bands.. Thus, in the United States, an RLAN system meeting the power level and antenna gain restrictions must still remedy any interference that it causes. Studies have shown that the presence of unrestricted outdoor wireless access system transmitters can cause significant interference to spaceborne active sensors that operate in the EESS and SRS. In addition, the ITU-R has concluded that restrictions are also necessary to protect the MSS feederlinks in the 5 150-5 250 MHz band. Lastly, preliminary ITU-R studies of radiolocation sharing with FWA have shown that large separation distances or other mitigation techniques such as receiver standards or error-correction coding are required to prevent mutual interference.

Active microwave sensors on board spacecraft are an increasingly important tool for monitoring the Earth's environment and oceans through the determination of wave height and oceanic currents as well as for radar imaging of the Earth’s surface. The need for an additional 110 MHz of spectrum adjacent to the current international allocation from 5 250 – 5 460 MHz is well documented within the ITU-R. The member space agencies of the Space Frequency Coordination Group (SFCG) have reviewed requirements for the various active sensor measurements, including TOPEX/POSEIDON and JASON. They have recognized the requirement for an extension of the existing allocated primary band (5 250 - 5 460 MHz) for enhanced vertical resolution for spaceborne altimeters and enhanced horizontal resolution for synthetic aperture radars (SARs). Studies and past operational experience has shown that operation in bands allocated to the radiolocation, radionavigation and aeronautical radionavigation services has proven to be feasible in the 5 460 – 5 570 MHz band.

WRC-97 first considered the possibility of an allocation upgrade for the radiolocation service in the 2.9-3.4 GHz and 5.35-5.65 GHz bands by placing this matter on the draft WRC-2001 Agenda. A need for 600 MHz of additional primary radiolocation spectrum for radiolocation systems has been determined. Changes in technology are driving the need for larger bandwidth in order to be able to pick smaller and less reflective radar targets out of background clutter. Experience and studies has shown that the radiolocation service can successfully share the band 5 350-5 650 MHz with radionavigation and EESS/SRS active systems. Studies of sharing between radiolocation and active space borne sensors carried out for CPM-97 by JWP 7-8R support such sharing.

U.S. VIEW: Based upon the long history of successful co-band operations and the JWP 7-8R studies, The United States supports the upgrade of the Radiolocation service to primary at 5 350-5 650 MHz. By the same reasoning, the EESS extension in the 5 460-5 570 MHz band is also supported. The United States believes that Wireless Access Systems (including RLANs) can successfully operate without an allocation on a non-protected, non-interference basis in the bands 5 150-5 350 and 5 470-5 725 MHz. The United States could support a primary allocation to the mobile service limited to Wireless Access Systems (including RLANs) use, with the rights and protections associated with such an allocation, if ITU-R studies determine the appropriate controls needed to ensure protection of existing services from single system and aggregate interference. The United States does not support an allocation for fixed service (FWA) in the 5 250 - 5 350 MHz band (Region 3) until testing shows mitigation techniques will protect existing services.

DRAFT UNITED STATES PRELIMINARY VIEW ON WRC-03

WRC-2003 Agenda Item 1.30[c]: to consider possible changes to the procedures for the advance publication, coordination and notification of satellite networks in response to Resolution **86** (Minneapolis, 1998);

ISSUE [c]: **Reduction of Data Requirements -** Potential modifications to Articles **S9** and **S11** of the Radio Regulations (RR) and associated appendices to the RR (*e.g.,* Appendix **S4**) with respect to the amount and type of information submitted to the Radiocommunication Bureau for coordination and notification.

BACKGROUND: Resolution **86 (Minneapolis, 1998)** resolves to request WRC-2000 and subsequent WRCs to continually review and update the advance publication, coordination and notification procedures, including the associated technical characteristics, and the related Appendices of the Radio Regulations, so as to ensure that they reflect the latest technologies, as well as to achieve additional simplification and cost savings for the Radiocommunication Bureau and administrations.

There is still a 32-month backlog for ITU publication of coordination special sections for satellite networks. WRC-03 may see proposals to simplify the RR procedures to speed up processing of coordination requests. There is ongoing work in WP4A related to proposed simplification of filings. WP4A is addressing the restructuring of the data to be supplied in notices to the ITU as well as suggesting amendments to Appendix S4 that would require certain data only for most interfering and most sensitive carriers and provision of e.i.r.p. instead of input power to antennas. The re-structuring and the amendments to Appendix **S4** are closely linked. The current WP4A studies cover certain congested FSS bands only, with the intention of expanding ultimately to remaining FSS bands and other services. The WP4A work may be reflected in the CPM 2002 report.

U.S. VIEW: The U.S. is in favor of simplification of filings for coordination and notification. Any reduction in mandatory Appendix **S4** coordination/notification information (**ApS4/II**) should be such that information essential to interference analyses is not eliminated. Additionally, any reduction in the **ApS4/II** data should not inadvertently eliminate administrations/networks for which coordination would be required under the existing Radio Regulations and Appendix **S4**. The benefits from simplifying or reformatting the Appendix **S4** data to reduce repetition should be carefully weighed against the potential cost of consequential modifications to the ITU software for capturing, validating and storing the data. Elimination of redundant information is encouraged.
